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DERWENT-ACC-NO: 1995-171062
DERWENT-WEEK: 199523

TITLE: Denitrification and desulphurisation of waste gas esp. from combustion without evapn. stage - by scrubbing with aq. ammonia soln., decomposing nitrite to nitrogen and water and oxidising sulphite to sulphate with oxygen in gas in hot zone after separating condensed sulphuric acid
INVENTOR-NAME: REMSTEDT, H
PRIORITY-DATA: 1993DE-4335867 (October 21, 1993)
PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
DE 4335867 A1	May 4, 1995	N/A	004	B01D 053/34

INT-C (IPC): A62D003/00; B01D005/00 ; B01D051/10 ; B01D053/14 ; B01D053/34 ; B01D053/86 ; F23J015/04 ; G05D021/00
ABSTRACTED-PUB-NO: DE 4335867A
BASIC-ABSTRACT: In the conversion of NOx and SOx into harmless waste gas constituents or crystals for removal of ammonium salts, the crude waste gas (I) is freed from H2SO4 condensate (II) by cooling.

After cooling to 30-50deg.C, the NO is (partly) oxidised to NO2 to improve the solubility. Removal of (II) and oxidn are carried out in the presence of an active compsn.

SO2 and NOx are scrubbed out with aq NH3 soln at 30-50deg.C in an absorber, pref. with a dwell of 1-10 s and pH of 6-9. The pretreated gas enters the hot zone of the absorber, where (NH4)2SO3 formed by absorption is oxidised to (NH4)2SO4 by the O2 in (I), whilst the dissolved NOx is converted to NH4NO2, which is decomposed to N2 and H2O in the hot zone, in which esp. the temp. is 60-90deg.C and dwell 10-120 min. The hot zone is below the cold zone and the

gas flows upwards, in countercurrent to the soln., so that a temp. and pH zone suitable for absorption, decomposition and oxidn. is obtd. in a suitable position in the absorber.

These processes need not proceed to completion, since they begin again when the absorption soln is recycled. Decomposition of NH4NO2 is favoured by the required acid pH by formation of (NH4)2SO4 from recycled (II) and from oxidn of (NH4)2SO3.

(NH4)2SO4 and opt. double ammonium sulphate-nitrate (if NO2 is present in excess of NO) is pptd. form the circulating soln continuously in a crystalliser and the crystals are sepd. after a dwell of up to 4 hrs., whilst the remaining mother liquor is recycled, esp. after adding fresh NH3 to convert NH4HSO3 to (NH4)2SO3 for layer absorption and dilute the mother liquor satd with (NH4)2SO4, so that no crystallisation occurs in the pipe.

The cold purified waste gas is freed from residual NH3 and give a moisture content higher than the original by scrubbing with (II). To ensure that it takes up a suitable amt. of water, the gas may be heated with warm cooling water, heated by heat exchange with (I), before passing through (II) to the flue.

The amt. and/or rate of circulation is increased to buffer variations in the impurity concn. or amt. of (I) by a corresp. excess of absorption soln.. Automated control is possible.

USE - The process is useful for removing NOx and SOx from (I) from combustion.

ADVANTAGE - The process avoids the need for concn. by evapn. to crystallise

salts; uses (II) for removing residual NH3 or salts; and uses the O2 in (I) for oxidising SO2 and NO ; and avoids the need for 100% oxidn. by recycling the absorbent.

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ADVANTAGE - The process avoids the need for concn. by evapn. to crystallise salts; uses (II) for removing residual NH3 or salts; and uses the O2 in (I) for oxidising SO2 and NO ; and avoids the need for 100% oxidn. by recycling the absorbent.

Derwent Accession Number - NRAN:

1995-171062

Title - TIX:

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Standard Title Terms - TTX:

DENITRIFICATION DESULPHURISE WASTE GAS COMBUST EVAPORATION STAGE SCRUB AQUEOUS AMMONIA SOLUTION DECOMPOSE NITRITE NITROGEN WATER OXIDATION SULPHITE SULPHATE OXYGEN GAS HOT ZONE AFTER SEPARATE CONDENSATION SULPHURIC ACID